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(54) VIDEO PRINTER, AND TEST PRINTING METHOD

(57)Abstract:

PROBLEM TO BE SOLVED: To simply set adjusting data that are optimum for image processing.

SOLUTION: Sample images are extracted by a thinning circuit 33 or an area defining circuit 34. Standard sample images processed with standard adjusting data respectively at a tint computing part 35, a density correcting part 36, a noise removing part 38 and a contour intensifying part 39, and corrected sample images processed with correction adjusting data each varied in stages from each of the standard adjusting data are formed against the sample images, and sample hard copies are formed with identification numbers added by image composition to those sample image. Adjusting data at each of processings are stored in an adjusting data memory 45 for each of the identification numbers. A sample image in an optimum finishing is decided with observation made on the sample hard copies. Then, the identification number of the decided sample

image is inputted. A controller 31 makes renewal with the adjusting data having the inputted identification number working as a new standard adjusting data, and the renewed data are automatically set in each of the parts 35-39.

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* NOTICES *

CLAIMS

[Claim(s)]

[Claim 1] In the video printer equipped with color correction and the image-processing means which carries out concentration amendment for the image which should be printed by hue operation part and the concentration amendment section A means to operate on a curtailed schedule the image which should be printed, or to specify the part, and to extract a sample picture, While arranging the criteria sample picture processed using each amount of criteria adjustments in said hue operation part and the concentration amendment section, and the amendment sample picture processed using the amount of amendment adjustments changed from each amount of criteria adjustments in step side by side to said sample picture A synthetic image creation means to compound the notation of discernment to these criteria sample picture and an amendment sample picture, and to create a synthetic image, The means which

the delimiter was made to correspond and memorized the amount of adjustments used for each sample picture, By the input of the delimiter given to the sample picture of a means to carry out the test print of said synthetic image, and to create sample hard copy, and the proper workmanship acquired by observation of said sample hard copy The video printer characterized by having calculated the amount of adjustments which corresponds from said storage means, having updated this amount of adjustments as an amount of criteria adjustments, and having an amount setting means of adjustments to set this as an image-processing means.

[Claim 2] In the video printer equipped with color correction, concentration amendment, and the image-processing means that carries out profile emphasis for the image which should be printed by hue operation part, the concentration amendment section, and the profile emphasis section A means to operate on a curtailed schedule the image which should be printed, or to specify the part, and to extract a sample picture, The criteria sample picture processed to said sample picture using each amount of criteria adjustments in said hue operation part, the concentration amendment section, and the profile emphasis section, While arranging the amendment sample picture processed using the amount of amendment adjustments changed from each amount of criteria adjustments in step side by side A synthetic image creation means to compound the notation of

discernment to these criteria sample picture and an amendment sample picture, and to create a synthetic image, The means which the delimiter was made to correspond and memorized the amount of adjustments used for each sample picture, By the input of the delimiter given to the sample picture of a means to carry out the test print of said synthetic image, and to create sample hard copy, and the proper workmanship acquired by observation of said sample hard copy The video printer characterized by having calculated the amount of adjustments which corresponds from said storage means, having updated this amount of adjustments as an amount of criteria adjustments, and having an amount setting means of adjustments to set this as an image-processing means.

[Claim 3] In the video printer equipped with color correction, concentration amendment, noise rejection, and the image-processing means that carries out profile emphasis for the image which should be printed by hue operation part, the concentration amendment section, the noise rejection section, and the profile emphasis section A means to operate on a curtailed schedule the image which should be printed, or to specify the part, and to extract a sample picture, The criteria sample picture processed to said sample picture using each amount of criteria adjustments in said hue operation part, the concentration amendment section, the noise rejection section, and the profile emphasis section. While arranging the amendment sample picture processed using the amount of

amendment adjustments changed from each amount of criteria adjustments in step side by side A synthetic image creation means to compound the notation of discernment to these criteria sample picture and an amendment sample picture, and to create a synthetic image, The means which the delimiter was made to correspond and memorized the amount of adjustments used for each sample picture, By the input of the delimiter given to the sample picture of a means to carry out the test print of said synthetic image, and to create sample hard copy, and the proper workmanship acquired by observation of said sample hard copy The video printer characterized by having calculated the amount of adjustments which corresponds from said storage means, having updated this amount of adjustments as an amount of criteria adjustments, and having an amount setting means of adjustments to set this as an image-processing means.

[Claim 4] The video printer characterized by having constituted the synthetic image from a multi-image which put said sample picture in order beyond the N line M train (N>=3, M>=3) in the video printer according to claim 1, having put in order the sample picture which changed tone into the line writing direction of a multi-image, and putting in order the sample picture which changed concentration in the direction of a train of a multi-image.

[Claim 5] The video printer characterized by having constituted the synthetic image from a multi-image which put said sample picture in order the N line M

train or beyond the M line N train (N>=4, M>=3) in the video printer according to claim 2, having put in order one line or the sample picture which changed [use / eye many N lines or / N train] the amount of adjustments of the profile emphasis section one train, and arranging in the remaining matrix the sample picture which changed tone and concentration.

[Claim 6] In a video printer according to claim 3, a synthetic image is constituted from a multi-image which put said sample picture in order beyond the N line M train (N>=4, M>=4). The sample picture which changed the amount of adjustments of the noise rejection section is arranged in one line or train of an one-line one train arranged outside at a L character mold. The video printer characterized by having arranged in the line or train of another side the sample picture which changed the amount of adjustments of the profile emphasis section, and arranging the sample picture which changed tone and concentration in the remaining matrix which adjoins these.

[Claim 7] It is. the test print approach of the video printer for determining the amount of optimum coordination using the video printer equipped with color correction and the image-processing means which carries out concentration amendment for the image which should be printed by hue operation part and the concentration amendment section -- Operate on a curtailed schedule the image which should be printed, or specify that part, extract a sample picture, and this

sample picture is received. While arranging the criteria sample picture

processed using each amount of criteria adjustments in said hue operation part

and the concentration amendment section, and the amendment sample picture

processed using the amount of adjustments changed from each amount of

criteria adjustments in step side by side Compound the notation of discernment

to these criteria sample picture and an amendment sample picture, and a

synthetic image is created. Make a delimiter correspond, memorize the amount

of adjustments used for each sample picture, carry out the test print of said

synthetic image, and sample hard copy is created. By the input of the delimiter

given to the sample picture of the proper workmanship acquired by observation

of said sample hard copy The test print approach of the video printer

characterized by using the amount of criteria adjustments which calculated the

amount of adjustments which corresponds from said storage means, updated

this amount of adjustments as an amount of criteria adjustments, set it as the

image-processing means and was updated at the time of the following print.

[Claim 8] It is the test print approach of the video printer which said synthetic

processing means is equipped also with the noise-rejection section and the

profile emphasis section, it changes each amount of adjustments of

noise-rejection processing and profile emphasis processing in step with each

amount of adjustments of hue data processing and concentration amendment

processing, it carries out a test print in the test print approach of a video printer according to claim 7, and is characterized by to update the obtained amount of optimum coordination as an amount of criteria adjustments.

DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to the video printer and the test print approach of creating the sample hard copy for finding adjustment values, such as concentration and a color, in more detail about a video printer and the test print approach.

[0002]

[Description of the Prior Art] The concentration and the tone adjustment dial for adjusting gradually the concentration and tone of an image which are recorded on a thermal recording ingredient to a video printer, for example, the thermal printer of thermal recording, are prepared. And it adjusts gradually to the color tinctured with greenishness from the color which wore redness for tone, or print density is gradually adjusted from a deep thing to a thin thing, and the print

which has desired concentration and tone is made to be obtained.

[0003]

[Problem(s) to be Solved by the Invention] However, when adjusting concentration after doubling tone well, for example even if it repeated the print, having made tone and concentration become independent and changing them little by little, it had often happened that adjusted tone has also changed. For this reason, creating how many sheets of that print sample, looking for the optimal thing out of it, and carrying out a print on that condition was performed. Therefore, a record ingredient becomes useless and there is a problem that adjustment will also take time amount.

[0004] Moreover, in the case of the business-use video printer, the exclusive monitor which has the function which indicates the workmanship image by simulation is formed, and adjustment of concentration or tone can also be easily performed now. On the other hand, in the case of the common video printer provided with individual use as a premise, in order to aim at a cost cut, a monitor is considered as the configuration using the television set which has generally spread in many cases. Therefore, since matching processing is not carried out so that the image which actually printed with the image displayed on the monitor, and was obtained may become the same, even if it sees monitor display and adjusts tone and concentration, there is a problem that this adjustment is not

reflected in a print result. Moreover, in the case of a video printer, there are other adjustments of noise rejection, profile emphasis, etc. besides adjustment of concentration or a color, and it was expected the method of adjusting these simply.

[0005] This invention aims at offering the video printer and the test print approach of being and having enabled it to set up optimum-coordination values, such as concentration and a color, simply for solving the above-mentioned technical problem.

[0006]

[Means for Solving the Problem] In order to attain the above-mentioned purpose, the video printer indicated to claim 1 A means to operate on a curtailed schedule the image which should be printed, or to specify the part, and to extract a sample picture, While arranging the criteria sample picture processed using each amount of criteria adjustments in hue operation part and the concentration amendment section, and the amendment sample picture processed using the amount of amendment adjustments changed from each amount of criteria adjustments in step side by side to a sample picture A synthetic image creation means to compound the notation of discernment to these criteria sample picture and an amendment sample picture, and to create a synthetic image, The means which the delimiter was made to correspond and memorized the amount of

adjustments used for each sample picture, By the input of the delimiter given to the sample picture of a means to carry out the test print of said synthetic image, and to create sample hard copy, and the proper workmanship acquired by observation of said sample hard copy The amount of adjustments which corresponds from said storage means is calculated, this amount of adjustments is updated as an amount of criteria adjustments, and it has an amount setting means of adjustments to set this as an image-processing means. Moreover, the video printer indicated to claim 2 gives a profile emphasis function to the image-processing section of a video printer according to claim 1, and enables a setup also of the amount of optimum coordination of this profile emphasis processing. Moreover, the video printer indicated to claim 3 gives a noise rejection function to the image-processing section of a video printer according to claim 2, and enables a setup also of the amount of optimum coordination of this noise rejection processing. In addition, the noise rejection section may be prepared in a video printer according to claim 1.

[0007] Moreover, it is desirable to constitute a synthetic image from a multi-image which put said sample picture in order beyond the N line M train (N>=3, M>=3), to put in order the sample picture which changed tone into the line writing direction of a multi-image, and to put in order the sample picture which changed concentration in the direction of a train of a multi-image.

Moreover, it is desirable to constitute a synthetic image from a multi-image which put said sample picture in order the N line M train or beyond the M line N train (N>=4, M>=3), to put in order one line or the sample picture which changed [use / eye many N lines or / N train] the amount of adjustments of the profile emphasis section one train, and to arrange in the remaining matrix the sample picture which changed tone and concentration. Moreover, a synthetic image is constituted from a multi-image which put said sample picture in order beyond the N line M train (N>=4, M>=4). It is desirable to arrange the sample picture which changed the amount of adjustments of the noise rejection section in one line or train of an one-line one train arranged outside at a L character mold, to arrange in the line or train of another side the sample picture which changed the amount of adjustments of the profile emphasis section, and to arrange the sample picture which changed tone and concentration in the remaining matrix which adjoins these.

[0008] Moreover, the test print approach of the video printer indicated to claim 7 Operate on a curtailed schedule the image which should be printed, or specify that part, and operate on a curtailed schedule the image which should extract and print a sample picture, or specify that part, extract a sample picture, and this sample picture is received. While arranging the criteria sample picture processed using each amount of criteria adjustments in hue operation part and

the concentration amendment section, and the amendment sample picture processed using the amount of adjustments changed from each amount of criteria adjustments in step side by side Compound the notation of discernment to these criteria sample picture and an amendment sample picture, and a synthetic image is created. Make a delimiter correspond, memorize the amount of adjustments used for each sample picture, carry out the test print of said synthetic image, and sample hard copy is created. By the input of the delimiter given to the sample picture of the proper workmanship acquired by observation of said sample hard copy The amount of adjustments which corresponds from said storage means is calculated, this amount of adjustments is updated as an amount of criteria adjustments, it is set as an image-processing means, and the updated amount of criteria adjustments is used at the time of the following print. As for said synthetic processing means, it is desirable to also have the noise rejection section and the profile emphasis section, and to change each amount of adjustments of noise rejection processing and profile emphasis processing in step with each amount of adjustments of hue data processing and concentration amendment processing, it to carry out a test print, and to update the obtained amount of optimum coordination as an amount of criteria adjustments.

[0009] To a sample picture, the criteria sample picture processed using each amount of criteria adjustments in hue operation part, the concentration

amendment section, etc. and the amendment sample picture processed using the amount of amendment adjustments changed from each amount of criteria adjustments in step arrange, and it is arranged, and the notation of discernment is compounded by a criteria sample picture and the amendment sample picture, and a synthetic image is created. The test print of the synthetic image is carried out, and sample hard copy is created. The sample picture of the optimal workmanship is chosen out of sample hard copy, and the delimiter given to this sample picture is inputted. The amount of adjustments corresponding to this is set as the image-processing section as an amount of criteria adjustments from the inputted delimiter. By repeating a test print similarly, the optimal amount of adjustments will be updated as an amount of criteria adjustments, and will be set as an image-processing means. Therefore, the amount of adjustments used as the optimal workmanship can be easily set up now.

[0010]

[Embodiment of the Invention] In drawing 1 , the external image input terminal 11 is formed in the video printer 10, and this external image input terminal 11 and the external image output terminal 13 of a video camera 12 are connected to it. Moreover, the external control input/output terminals 14 and 15 prepared, respectively are also mutually connected to a video printer 10 and a video camera 12. A video camera 10 unifies the video tape recorder and camera

according to well-known 8mm specification, and has the image transcription and the regenerative function.

[0011] The NTSC signal sent out from the external image output terminal 13 is incorporated through the external image input terminal 11 of a video printer 10 in the Y/C separation circuit 21. The Y/C separation circuit 21 divides an NTSC signal into a luminance signal (Y) and a chrominance signal (C), and sends it to a decoder 22. A decoder 22 changes a luminance signal (Y) and a chrominance signal (C) into red (R), green (G), and a blue (B) three-primary-colors signal, and sends them to A/D converter 23 and a selector 24.

[0012] A selector 24 is usually set to a terminal (a) side by the playback mode, and is set to a terminal (b) side by the freeze mode. If a selector 24 is set to a terminal (a) side, image data will be sent out to the external image output terminal 26 through an encoder 25, and the video image under playback to the color monitor 27 which consists of a television set connected to this will be displayed. In a freeze mode, after the chrominance signal of each color is quantized with A/D converter 23, for example, being changed into a digital signal with 64 gradation, it is written in a frame memory 28. And this image data is sent to a color monitor 27 through the selector 24 set to the D/A-converter 29 and terminal (b) side. Said frame memory 28 consists of the three memory sections which memorize one image data of three colors at a time independently of each.

[0013] A controller 31 reads the image data of one classification by color among three colors at the time of the usual print, and sends this to the image-processing section 32. The image-processing section 32 performs each processing of color correction, concentration amendment, noise rejection, profile emphasis, image composition, etc. Moreover, a controller 31 chooses either the infanticide circuit 33 or the block-definition circuit 34 at the time of test print mode, and incorporates the image data used as a sample. When the principal parts, such as a person, tend to be specified and it is going to obtain the multi-image of this, the block-definition circuit 34 is chosen. Moreover, when making into a sample picture the image for one frame which it is going to print, the infanticide circuit 33 is chosen.

[0014] The infanticide circuit 33 thins out the image data for one frame in a frame memory 28 at intervals of predetermined as everyone knows, and makes it the amount of data of the reduced size. The block-definition circuit 34 judges the central part of a whole image as the principal part, and reads the image data of this principal part area from a frame memory 28. In addition, you may make it direct principal part area by operating a keyboard, specifying a central part uniformly as the principal part, and also looking at a monitor image.

[0015] The image-processing section 32 consists of the matrix operation part 37 which consists of hue operation part 35 and the concentration processing

section 36, the noise rejection section 38, the profile emphasis section 39, and the image composition section 40. Said hue operation part 35 performs hue amendment using well-known matrix operation expression, and also performs color conversion to cyanogen (C), a Magenta (M), and yellow (Y) from R, G, and B. The difference between the spectral characteristic of the color thermal recording ingredient 41 and the spectral sensitivity of a video camera 12 is amended by hue amendment. The concentration processing section 36 performs gradation amendment of a gamma correction, contrast amendment, etc. Thereby, while the stimulus value of the photographic subject of an image pick-up system is changed into a concentration signal, the proper gradient according to the color thermal recording ingredient 41 is held. And the degree of hue amendment can be changed by changing a matrix operation multiplier. Moreover, a concentration processing degree can be similarly changed by changing a concentration processing multiplier. The adjustment data which consist of these matrices operation multiplier and a concentration processing multiplier are read from the adjustment data memory 45 by the controller 31, and are set as the hue operation part 35 and the concentration processing section 36. In addition, this hue operation part 35 and the concentration processing section 36 are put in block using well-known look-up table memory, and it may be made to perform them. Moreover, after performing concentration processing, it may be

made to perform a hue operation.

[0016] The noise rejection section 38 consists of a line type filtering circuit and a logic filtering circuit as everyone knows, and operations, such as the weighted mean for noise rejection, mean value filtering which is the noise rejection which does not obscure a boundary are performed. And the degree of this noise rejection can be changed by changing the level of noise rejection.

[0017] The profile emphasis section 39 performs profile emphasis processing by the image data of the target pixel and the pixel in this perimeter based on well-known profile emphasis operation expression. At this time, the degree of profile emphasis can be changed by changing a profile emphasis multiplier.

[0018] Each criteria adjustment data in the hue operation part 35, the concentration processing section 36, the noise rejection section 38, and the profile emphasis section 39 and the amendment adjustment data for a test to which this was changed with the predetermined step value are written in the adjustment data memory 45. These data are written in the adjustment data memory 45 by using as address data ********** 62 given to each sample picture 61 of the synthetic image 60 for test patterns as shown in drawing 2 explained later. At the time of a test·print, according to the identification number sent from the recognition signal generating section 46, a controller 31 sets each data corresponding to this identification number as each part 35, 36, 38, and 39, and

creates the synthetic image for a test print. Moreover, at the time of the usual print, criteria adjustment data are set as each part 35, 36, 38, and 39. And if the sample picture 61 of the optimal workmanship is chosen and the identification number of this is inputted as a result of a test print so that it may explain in detail later, the data used for this identification number will be updated as criteria adjustment data by the controller 31, and it will be written in the identification number of the sample picture from which this serves as criteria. Similarly, based on this updated criteria adjustment data, each amendment adjustment data is updated with a predetermined step value.

[0019] The image composition section 40 is written in the frame memory 47 for a print prepared for every color, and creates the synthetic image 60 as shown in drawing 2 so that it may be used when test print mode and a multi-printing mode are chosen, and a sample picture and a print image may be arranged in in the shape of a matrix according to a synthetic predetermined pattern. At this time, image composition of this identification number 62 is carried out at each sample picture 61 according to the recognition signal of the recognition signal generating section 46. Moreover, image composition can be carried out and it can also recognize a closing line 65 now easily that the sample picture 61 surrounded by this is a criteria sample picture. Similarly, closing lines 66 and 67 are shown and it can be made to perform discernment from the sample picture 61 to which

processing with concentration and tone was carried out, and the sample picture 61 to which other profile emphasis processings and noise rejection processings were carried out easily.

[0020] The synthetic image of one line of the frame memory 47 for a print is written at a time in the line memory 48. The head mechanical component 49 drives a thermal head 50 based on the image data for one line from this Rhine memory 48. As everyone knows, much heater element 50a is arranged in the shape of Rhine, and a thermal head 50 heats the color thermal recording ingredient 41, and performs sequential record 3 color plane.

[0021] The controller 31 consists of well-known microcomputers, and carries out sequence control of each part of a video printer 10. The keyboard 51 and the display 52 are connected to the controller 31, and a setup and input in various modes can be performed now. As the mode which is related to this invention, there are test print mode and the usual printing mode.

[0022] In test print mode, the synthetic image for a test print is created and this synthetic image is written in the frame memory 47 for a print. And the synthetic image of one line is read at a time from this frame memory 47, and the sample hard copy 59 which multi-displayed the sample picture 61 as shown in drawing 2 is created.

[0023] Drawing 3 is a flow chart which shows the procedure for creating a

synthetic image. First, a principal part image or a whole image is chosen as a sample picture. When making a principal part image into a sample picture, the central part of a whole image is specified by the block-definition circuit 34 as the principal part. Moreover, when a whole image is chosen, the image data in a frame memory 28 is thinned out by the infanticide circuit 33 at intervals of predetermined, and is made the amount of data of sample picture size.

[0024] Next, a controller 31 reads the adjustment data of an identification number n= 1 from the adjustment data memory 45, and sets this as each part 35, 36, 38, and 39 of the image-processing section 37. Based on this adjustment data, each processing of a hue operation, concentration processing, noise rejection, and profile adjustment is performed, and this is sent to the image composition section 40. In the image composition section 40, image composition of the identification number "1" is carried out in the corner of a sample picture [finishing / each processing], and this is written in the area of the identification number 1 of a frame memory. Hereafter, 15 kinds of image processings are performed similarly, and this sample picture is written in the area of each identification number [of a frame memory 47] "2" - "16." A synthetic image is similarly created about other colors. In addition, with this operation gestalt, the identification number "5" is made into the criteria sample picture of a color and concentration, and the criteria adjustment data of the hue operation part 35 and

the concentration processing section 36 are used to this identification number "5." Moreover, the identification number "13" is made into the criteria sample picture of noise rejection processing and profile emphasis processing, and the criteria adjustment data of the noise rejection section 38 and the profile emphasis section 39 are used to this identification number "13."

[0025] Drawing 2 shows the sample hard copy 59 which showed an example of the pattern of the synthetic image 60, and 16 sample pictures 61 bundle it up in procession of 4x4, and it is displayed. And the test pattern consists of seven sample picture matrices 64 (surrounded with the dashed line) which have the identification number of nine sample picture matrices 63 which have the identification number 62 of - "9" and "1""10" arranged at L character mold so that this may be surrounded - "16" enclosed with a dotted line. And what changed concentration and a color using nine sample pictures 61 which have identification number "1" - "9" is displayed, what changed the profile emphasis multiplier using four sample pictures 61 of identification number "10" - "13" is displayed, and what changed the level of noise rejection using four sample pictures 61 of identification number "13" - "16" is displayed. In this case, the image used as the criteria which used criteria adjustment data for the sample picture "5" and the sample picture "13" is displayed.

[0026] Moreover, in the sample picture matrix 63 which has the identification

number 62 of "1" - "9", if it moves to left-hand side to the sample picture 60 used as the criteria which have an identification number "5", greenishness will be emphasized, and if it moves to right-hand side, redness is emphasized. Furthermore, if it moves to the bottom to the sample picture 60 used as the criteria which have an identification number "5", concentration will become deep, and if it moves to the bottom, he is trying for concentration to become thin. Therefore, since each sample picture 60 which has the identification number 62 of "1" - "4" and "6" - which changed concentration and a color in step "9" is displayed so that the sample picture 60 used as the criteria of an identification number "5" may be surrounded, the sample picture 60 used as the optimal color and concentration can be found out efficiently.

[0027] Moreover, in the sample picture 60 which has the identification number 62 of "10" - "13", to the sample picture 60 which has the identification number 62 of "13", it is arranged so that it may become strong to the degree of profile emphasis gradually, as it moves to the bottom. Moreover, in the sample picture 60 which has the identification number 62 of "13" - "16", to the sample picture 60 which has the identification number 62 of "13", it is arranged so that the degree of noise rejection may become strong gradually, as it moves to left-hand side. Therefore, the optimal thing can be easily chosen now also about a profile emphasis degree or a noise rejection degree. In this case, although based on

the sample picture 61 which has the identification number of "13", this is good on

the basis of the sample picture 61 which has other identification numbers, "12",

and "14". [for example,]

[0028] As shown in drawing 4 , as for the color thermal recording ingredient 41,

the cyanogen sensible-heat coloring layer 71, the Magenta sensible-heat

coloring layer 72, the yellow sensible-heat coloring layer 73, and the protective

layer 74 are ****(ed) one by one on the base material 70. As a base material 70,

opaque coat paper or plastic film is used. The cyanogen sensible-heat coloring

layer 71 contains an electron-donative color precursor and an electronic

receptiveness compound as a principal component, and when heated, it colors

them in cyanogen. As a Magenta sensible-heat coloring layer 72, the maximum

absorption wavelength contains the diazonium salt compound which is about

365nm, and the coupler which carries out thermal reaction to this and colors to a

Magenta. If this Magenta sensible-heat coloring layer 72 irradiates the ultraviolet

rays near 365nm after heat record, a non-colored diazonium salt compound will

photodissociate and coloring capacity will be lost. The yellow sensible-heat

coloring layer 73 contains the diazonium salt compound whose maximum

absorption wavelength is about 420nm, and the coupler which carries out

thermal reaction to this and colors to yellow. If this yellow sensible-heat coloring

layer 73 irradiates the ultraviolet rays near 420nm, optical fixing will be carried

out and coloring capacity will be lost. In addition, the ultraviolet ray lamp for optical fixing has omitted illustration.

[0029] Next, an operation of this operation gestalt is explained. In order to print the video image recorded on videotape with the video camera 12, the external image input/output terminals 11 and 13 of a video printer 10 and a video camera 12 and the external control input/output terminal 14, and 15 comrades are connected, respectively, and a color monitor 27 is connected to the external image output terminal 26 of a video printer 10.

[0030] Next, the monitor change key of a keyboard 51 is operated, a playback mode is usually chosen, and it is made this mode. Thereby, a video signal is incorporated through the external image output terminals 13 and 11 in the Y/C separation circuit 21 as an NTSC signal, and is divided into a luminance signal (Y) and a chrominance signal (C) here. These luminance signals (Y) and chrominance signals (C) are changed into the three-primary-colors signal of R, G, and B by the decoder 22. A three-primary-colors signal is sent to A/D converter 23 and a selector 24. Usually, since the selector 24 is set to the terminal (a) by the playback mode, a three-primary-colors signal is sent to an encoder 25, and is projected on a color monitor 27 as a playback image through the external image output terminal 26.

[0031] If a scene to print next appears, checking the image of a color monitor 27,

a monitor change key is operated and it switches to a coma delivery playback mode, and it will reproduce one coma at a time, operating a coma delivery key. A memory key is operated when a desired image is displayed. By this, a selector 24 is switched to a terminal (b) side, and a controller 31 displays the image which it is going to print on a color monitor 27 while writing the digital signal quantized by A/D converter 23 in a frame memory 28.

[0032] In this condition, by operating the print key of a keyboard, yellow image data is first read from a frame memory 28, the image processing of this is carried out with each criteria adjustment data in the image-processing section 32, and it is written in the frame memory 47 for a print. Similarly, the image processing also of other Magenta image data and cyanogen image data is carried out, and they are written in the frame memory 47 for a print. And the yellow image data of one line is first written at a time in the Rhine memory 48 from this frame memory 47 for a print. This image data for one line is sent to the head mechanical component 49. The head mechanical component 49 drives a thermal head 50 based on the image data for one line. If the yellow image data for one line is supplied first, the drive of a thermal head 50 will heat the yellow sensible-heat coloring layer 73 of the color thermal recording ingredient 41, and will record the yellow image of one line at a time. By the ultraviolet ray lamp for yellow, the ultraviolet rays of predetermined wavelength are irradiated and optical fixing of

the part on which this yellow image was recorded is carried out. Similarly, thermal recording also of other Magenta sensible-heat coloring layers 72 and the cyanogen sensible-heat coloring layer 71 is carried out. And at the time of Magenta thermal recording, optical fixing of the Magenta sensible-heat coloring layer 72 is carried out by the ultraviolet ray lamp for Magentas.

[0033] Moreover, in carrying out a test print, the test print key of a keyboard 51 is operated and it makes it test print mode. In this case, when it is chosen whether the principal part is first made into a sample picture or a whole image is made into a sample picture and it makes the principal part a sample picture, the image data of the principal part is sent to the image-processing section 32 by the block-definition circuit 34. Moreover, when making a whole image into a sample picture, the image data in which data were thinned out by the infanticide circuit 33 at intervals of predetermined is sent to the image-processing section 32. In addition, you may set it as either beforehand in this way instead of choosing the principal part or a whole image as a sample picture each time.

[0034] First, a controller 31 controls the identification number generating section 46, specifies an identification number "1", reads the adjustment data corresponding to this identification number from the adjustment data memory 45, sets this as the hue operation part 35 of the image-processing section 32, the concentration processing section 36, the noise rejection section 38, and the

profile removal section 39, and performs each processing based on this set-up

adjustment data. And sample picture data [finishing / processing] are written in

the area of the identification number "1" of the frame memory 47 for a print. At

this time, image composition of the identification number "1" is carried out by the

image composition section 40 at a sample picture. Hereafter, each processing

based on the adjustment data corresponding to each identification number is

performed, this processed sample picture data is similarly, written in the area

corresponding to each identification number, and image composition of the 16

multi-images is carried out. The synthetic image 60 (refer to drawing 2) which

consists of this 16 multi-image is 3-color-plane-sequence-degree-recorded like

the aforementioned usual printing mode through the Rhine memory 48, the head

mechanical component 49, and a thermal head 50, and the sample hard copy 59

is created.

[0035] Drawing 5 shows the configuration procedure of each adjustment data to

the image-processing section 32 based on the sample hard copy 59. The

sample hard copy 59 is observed, the sample picture used as the optimal

workmanship is chosen, this identification number is operated and a keyboard

51 is inputted. since the test print other than tone and concentration is performed

also with noise rejection processing and profile emphasis processing with this

operation gestalt -- first -- tone and concentration -- the optimal -- finish -- **** --

the sample picture which is is chosen and this identification number is inputted.

After this input, the sample picture of the optimal workmanship in noise rejection

processing is chosen, and this identification number is inputted. Similarly, the

sample picture of the optimal workmanship in profile emphasis processing is

chosen, and this identification number is inputted. If each [these] identification

number is inputted by actuation of a keyboard 51, a controller 31 will update the

adjustment data memory 45 by using the adjustment data of an identification

number n as new criteria adjustment data. Similarly, other adjustment data for a

test are rewritten according to renewal of this criteria adjustment data.

[0036] If a test print is performed again, the sample hard copy 59 will be created

based on new criteria adjustment data. This sample hard copy 59 will be

observed and the adjustment data which serve as optimal workmanship by

newly choosing the sample picture used as the optimal workmanship will be

obtained. Thus, since criteria adjustment data are updated according to the

result of a test print, easy moreover, the adjustment data used as the optimal

workmanship can be set up with a sufficient precision. Moreover, at the time of

the usual print, criteria adjustment data are set as the hue operation part 35, the

concentration processing section 34, the noise rejection section 38, and the

profile emphasis section 39. Since heat record of the image processing is

performed and carried out by operating a print key based on this set-up criteria

adjustment data, the hard copy of proper workmanship is obtained. In addition, when the sample picture 61 which serves as optimal workmanship with 1 time of a test print is not obtained, the test print which made this sample picture the criteria sample picture is obtained by the following test print in inputting the identification number of the sample picture considered for workmanship to be good in it. Thus, by repeating a test print, each adjustment data with which workmanship becomes the best can be obtained now. Moreover, when each sample picture of sample hard copy is not changing so much, the step value of each adjustment data may be changed greatly.

[0037] <u>Drawing 6</u> shows an example of other sample hard copy 79, and records it as a synthetic image 81 which consists of a multi-image which arranged in four-line four trains 16 sample pictures 80 to which each adjustment data of a hue operation, concentration processing, noise rejection, and profile emphasis was changed in step, and image composition of each identification number 82 of "1" - "16" is carried out also in this case at the sample picture 80. In this sample hard copy 79, the sample picture 80 is extracted by making a center section into the principal part in the block-definition circuit 34. and the inside of the sample picture 80 of 16 pieces -- the optimal -- finish -- **** -- only one thing which is can be chosen and each adjustment data can be easily set as the optimal thing only by inputting the identification number n of this selected sample picture 80. In

addition, the number of pieces of a sample picture 80 may be suitably fluctuated like 3x3, 3x4, 3x5, 4x5, 4x6, and 5x5 grade, without being limited to 16 pieces. Moreover, a display mode is also tidily arranged in an N line M train, and also you may make it scattered.

[0038] Drawing 7 shows an example of other hard copy 84, the sample picture train 87 which is the synthetic image 86 which consists of a multi-image which displayed 16 sample pictures 85 on four-line four trains, and changed profile emphasis level using one train is displayed, and the sample picture matrix 88 to which the adjustment data of tone and concentration were changed in step using the remaining matrix of 4x3 is displayed. A sign 89 is a closing line and a batch requires image sequences 87 and the image matrix 88. In addition, it may replace with the sample picture train 87 which changed profile emphasis level, and the sample picture train which changed noise rejection level may be recorded. Similarly, as shown in drawing 2 , although the sample picture which changed the processing level of profile emphasis and noise rejection using one-line one train of the shape of L character arranged outside in a multi-image was displayed, it may change into this and only the sample picture of either profile emphasis or noise rejection may be displayed using this one-line one train.

[0039] In addition, although the sample picture used as the criteria which carried out the image processing by criteria adjustment data is arranged in the center

section of the synthetic image and it enables it to choose the optimal workmanship sample picture as it by contrast with this with the above-mentioned operation gestalt In a matrix including the line or train of even number like 4x4, 4x3, and 6x6 Since a sample picture will not be arranged at a mid gear and the corner of each sample picture will only be located, this mid gear is used as criteria adjustment data. Each adjustment data may be changed in step as it separates from this mid gear, and the sample picture by the image processing using each of these adjustment data may be arranged. Moreover, it is good also as an image which serves as criteria in one of the sample pictures which adjoin a mid gear instead of doing in this way.

[0040] Moreover, although this invention is carried out with the above-mentioned operation gestalt to the video thermal printer which records an image on the color thermal recording ingredient with which the laminating of the sensible-heat coloring layer was carried out, the thermal printer of the thermal imprint recording method of the sublimation mold for example, using an ink sheet or a melting mold and the printer of the ink jet method which prepared the ink discharge nozzle in the recording head may be used. Moreover, although the line printer was explained, this invention may be applied to a serial printer. Moreover, although image data was inputted into the video printer using image transcription / playback video camera, image data may be inputted into a

magnetic disk or IC memory card using the still video camera which records a still picture. Moreover, image data may be inputted from a personal computer. Moreover, although this invention was carried out with the above-mentioned operation gestalt to the video printer which records a color picture, this invention may be carried out to the video printer which records the halftone image of monochrome.

[0041]

[Effect of the Invention] According to this invention, since the synthetic image which compounded the notation of discernment to each sample picture was created, the test print of this synthetic image was carried out and sample hard copy was created while extracting the sample picture, changing each amount of adjustments, such as hue operation part and the concentration amendment section, in step to this sample picture and putting a majority of these sample pictures in order, the optimal workmanship condition of each processing, such as a hue operation and concentration amendment, can be easily known with a test print. And each adjustment data can be easily set automatically only by inputting the identification number given to each sample picture.

[0042] Moreover, since the sample picture which changed the amount of adjustments of profile emphasis or noise rejection other than each processing of a hue operation or concentration amendment in step was also displayed, profile

emphasis and each processing of noise rejection can be set up easily [the optimal level]. By arranging a criteria image in the center section of the multi-image which put many sample pictures in order especially, direct contrast observation can be carried out with a criteria image, and optimal adjustment level can be determined easily.

[0043] Moreover, a sample picture is constituted from a multi-image put in order beyond the N line M train (N>=4, M>=4). The sample picture which changed the amount of adjustments of the noise rejection section is arranged in one line or train of an one-line one train arranged outside at a L character mold. By arranging in the line or train of another side the sample picture which changed the amount of adjustments of the profile emphasis section, arranging the sample picture which changed tone and concentration in the remaining matrix which adjoins these, and constituting a multi-image Besides the decision of the optimal amount of adjustments of tone and concentration, the optimal amount of adjustments in each processing of profile emphasis and noise rejection can be determined easily.

[0044] By the input of the delimiter given to the sample picture of the proper workmanship acquired by observation of sample hard copy, the amount of adjustments which corresponds from a storage means calculates, this amount of adjustments updates as an amount of criteria adjustments, and it sets as an

image-processing means, and since the updated amount of criteria adjustments used at the time of the following print, easy moreover, each amount of adjustments which becomes with the optimal workmanship can set up with a sufficient precision by repeating a test print. Therefore, **** is in each video printer, and in the amount of criteria adjustments beforehand set up at the time of factory shipments etc., even when desired workmanship is not acquired, it can respond easily.

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] It is the functional block diagram showing the outline of a full color thermal printer in which this invention was carried out.

[Drawing 2] It is the top view showing an example of the sample hard copy obtained by this full color thermal printer.

[Drawing 3] It is the flow chart which shows the procedure which creates the synthetic image for sample hard copy.

[Drawing 4] It is the schematic diagram showing the layer structure of the color thermal recording ingredient used with the full color thermal printer of this

invention.

[Drawing 5] It is the flow chart which shows the procedure of setting the adjustment data of each processing automatically from sample hard copy.

[Drawing 6] It is the top view showing an example of the sample hard copy in other operation gestalten.

[Drawing 7] It is the top view showing an example of the sample hard copy in other examples.

[Description of Notations]

10 Video Printer

12 Video Camera

27 Color Monitor

28 47 Frame memory

31 Controller

32 Image-Processing Section

33 Infanticide Circuit

34 Block-Definition Circuit

35 Hue Operation Part

36 Concentration Processing Section

37 Matrix Operation Part

38 Noise Rejection Section

39 Profile Emphasis Section

40 Image Composition Section

41 Color Thermal Recording Ingredient

45 Adjustment Data Memory

50 Thermal Head